DR-43. SYNTHESIS AND CHARACTERIZATION OF A NAPHTHALIMIDE-BENZONITRILE DERIVATIVE AND EVALUATION OF OPTOELECTRONICS PROPERTIES

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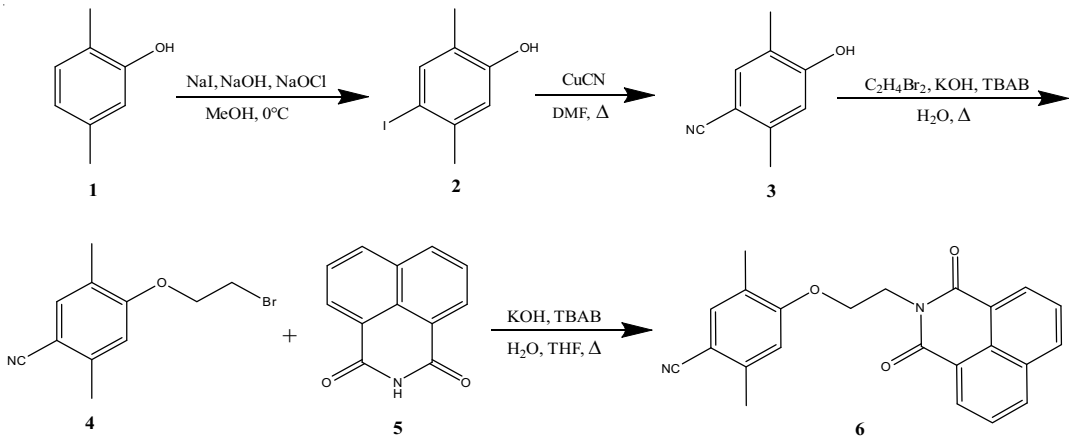
Organic fluorescent dyes were always intensely studied in biological area due to their excellent properties that combine high sensitivity and selectivity for tracing the presence of specific biomolecules. In recent decades this type of dyes has gained much attention for a broader types of application as sensors, liquid crystal displays, organic light emitting diodes (OLED), and more recently, in organic solar cells (OSC).

Concerning the OSC application, fluorescent dyes as the 1,8-naphthalimide and its derivatives have gain a lot of attention, mainly due their chemical stability, planarity, and high quality of solar energy collection, resulted from the combination of high fluorescent quantum yield and large Stokes shift. Those properties make naphthalimide derivatives attractive for OSC application as *p*-type materials, when it is linked to conjugated polymers backbone.

However, to be used in OSC as small molecules a suppression of the fluorescence emission can represent an advantage to the increasing of Power Conversion Efficiency (PCE). To make it happen the energy generated from the excited state of the fluorescent dye should convert the exciton more readily than been loss by the emission pathway. Some recent reports involving small molecules derivatives from naphthalimide, applied in OSC has been published with Power-Conversion Efficiency (PCE) over 2,5 %. A way of suppressing the fluorescence emission of naphthalimide derivatives and, at the same time, keep all the other properties previously described, is to link a moiety to the imidic N-position.

This paper reports the synthesis and characterization of a naphthalimide-derivative bonding a benzonitrile directly to the imidic N-position of 1,8-naphthalimide, aiming to produce the molecule [4-[2-(1,3-dioxo-1H-benzo[de]isoquinolin-2(3H)-il)etoxy]-2,5-dimethylbenzonitryle] (Dyad-NB). Benzonitrile units are capable to stabilize energy levels HOMO and LUMO of semiconductors due to the presence of CN groups. Some organic solar cells were constructed with the new molecule for optoelectronics properties investigations.



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